

## What makes good bench?

There are many features that we have to focus on in creating a comfortable bench. Such as materials, the size, style and their angle. Other than those, people must consider and decide whether benches will be built in, for example, park, or in the city, it all depends on what you think and your focusing.

Now we are going to build a bench for the seaside. Then I might have to aware of the issues such as sunlight, raining, splash down from the ocean, and most importantly how does it provide comforts to other.

To make it comfortable, I have realize that the angle setting is very important too. I saw there were benches with 90 degree back, I don't feel like to sit on it because I doesn't seem comfortable at all. From eHow.com Health, Here are the result.

## Setting Up the Bench

- In order to most effectively target the upper chest muscles, the bench must be angled at approximately 30 degrees. Being angled at less than 30 degrees is okay, but more than that leads to ineffective muscle targeting and exercise of the deltoids. Some incline benches are already established at a 30-degree angle and do not require adjustment to the proper position.

## Positioning Your Body

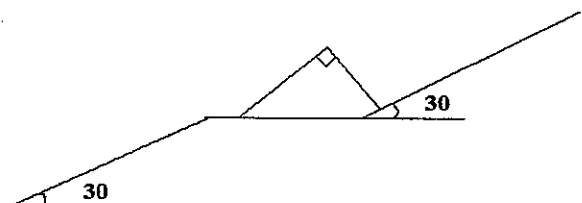
- After lying down on the bench, position your feet so that they are firmly on the floor approximately shoulder-width apart. Once planted, do not to move your feel around, particularly while performing the exercise. Foot movement decreases your ability to tighten up your whole body, thus reducing the effectiveness of the exercise.

## Gripping the Bar

- Once positioned, use a spotter to hand you the bar. Grip the bar in such a way that when you bring the bar down to your chest, your forearms are at a 90-degree angle to the bar. In addition, ensure your rear deltoids do not come off of the bench, as doing so will adjust the angle of your body and target less of the upper chest muscles.

However I'm not going have a 30 degree bench because that is some kind of bench used for sun-shine.

However I respect their opinion, I think the "30 degree" isn't so bad. I think 120 degree will give comfortable however I have an experience when sitting on a bench



like that, the purpose of bench is for people to rest, have some water and eat their lunch what ever, however sitting on a 120 degree bench will makes you tired. Lets do some physics, 120 degree is likely on the middle where gravity (weight) pulls you down, you will physically using energy from your chest when there no "long enough back". I think 105 degree will be the best, think about 110, when it still goes with some weight pulling you down, it cause ineffective benefits. 100 might be too straight.

Let's talk about materials, there are lots of material that we can use for a bench, however the better the value does not mean to better their do. Such as iron, it has strong bonding which is mean tough, hard to break, however when there is sun shining under it, people who sit on that bench will burn their skins.

Woods aren't tough compare to metals, however it absorb less heat compare to metals because they are worst conductors. However when the ocean splashed water on it, it will moles, at the same time, what if termites attack? Its good you use plastic, however it surely come an handy when fat guys sit on it.

For a few reasons, I will combine these material together. I'm going to use metal for the body where we sit on it, to reduce the amount of heat we will be facing, I will use woods because it conduct badly. And also in-order to protect them from termites, I will galvanize the wooden plate with plastics.

For the size, length or other aspect, I will depend on the average of my classmates' result.

Name	Height (cm)	Arm	Lower body	Upper body
Mike Chan	173	75	96/52/55	49.4
Matthew Lok	173	75.7	95/53/54	51.2
Kelvin To	171	74.3	94/50/52	50.6
Nixon Poon	171	74	94/54/53	55
Willy Yap	169.5	74	91/52/55	59.5
Nathan Yip	173	76.2	90/53/50	53
Dominic Chan	174	77	95/52.5/54	65
Jeffery Wong	175.5	78	98/56/57	61.5
Wesley Hui	177	77.5	98/55/57.5	64

Wong Jeffery, People height result, personal conversation, 25<sup>th</sup> September.2011.

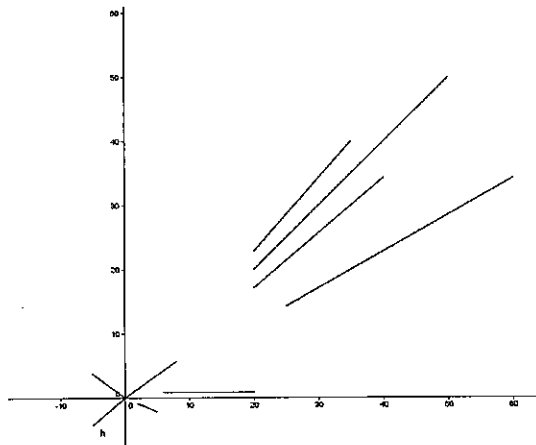
I also need to draw a angle for my draft, here are the fomular.

$M = \text{rise/run}$

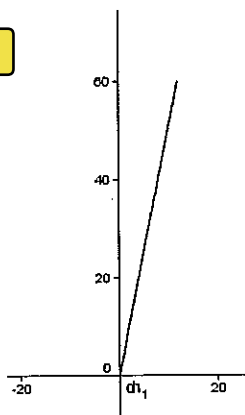
$Y = m_1x + b_1 / y = m_2x + b_2$

$(\text{run}_1/\text{rise}_1) \cdot (\text{run}_2/\text{rise}_2) = (\text{square root} / \text{run } 1^2 + \text{rise } 1^2)^2 \times (\text{square root} / \text{run } 2^2 + \text{rise } 2^2)^2 \cos \text{ angle.}$

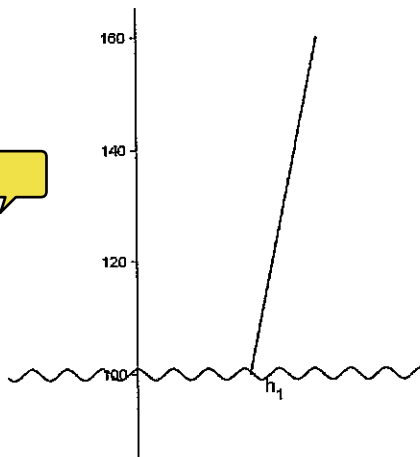
## Bench evaluation



When I was trying to do raise and run, I found something very expert, Mr Slosberg has given that :  $\text{Function}[r1/r2x, h, k]$  I do a lot of them based on  $x/7$  and changing H and K. And I found out that all the stroke are on the same area, same direction (almost) and the length. Which means that I found out h and k are about the function.

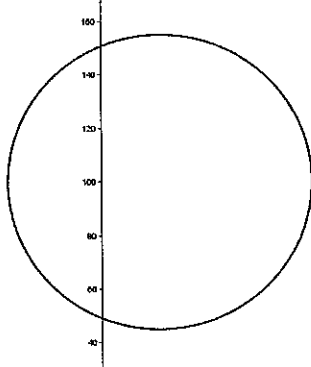


And I also have found out that creating thing using math cannot do perfectly, even if you wanted to, this is  $\text{Function}[5x, 0, 12]$ , I created it using an angle and a ruler and stick both of them on the scene so that I can get the function that I should have, and angle I wanted. This equation is about run and raise, I created it because I need an angle and this will do it for me. 12 is just 60 cm if it was  $5x$ , however it touches the 0 which is not clear, so that I changed 0,12 to 20,32 so it moves up and a bit right.



$$y = \cos(x) + 100$$

This equation was came from the purpose of comfortable, to back an unbalance feel for the butt. However I though it was too sharp now, I'm going to change it to:  $y = \cos(x) c + 100$ , by changing the c will let me sketch.



After doing more of raise and run, I found out that it was just straight line, and that doesn't help me to achieve a high enough level at all.

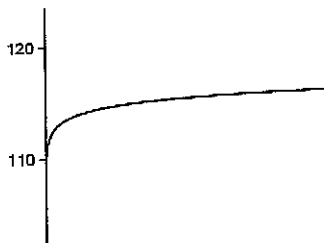
This diagram is a circle which is k:  $(x - 21)^2 + (y - 100)^2 = 3025$ , by minus or plus x and y will get a



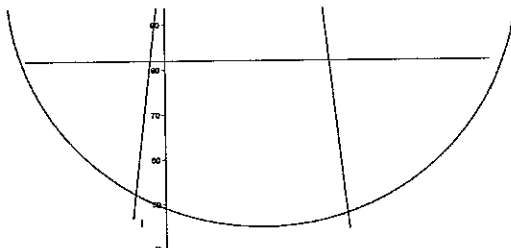
result of moving the circle. The  $R^2$  is its size, and I used it as 3025 because It will cover the chair, however I don't know how to do function with it.



This is the same thing with the back of the bench, a slightly different because it goes to the other side which is the negative side. Function[9 x + 110, -7, 0]. I tried to move to a position that I wanted and do function, this will make my life much easier as the result.



This is a sign of LOG. The whole equation will be Function[log(x) + 113, 0, 24], by plus or minus it outside will move it up and down. Because my chair was on the middle of the graph, I don't have to move it around and I was lucky because I don't know the terms.



That straight line's equation is Function[82, -30, 70], original  $y=82$ , Its so simple, by changing y to x will form a vertical straight line because x is vertical (mark) as I say,

because y is horizontal so it should be a horizontal straight line. This straight line is for handle the whole bench for not to break.

Overall equations:

Log(x)

$X^2 + y^2 = r^2$

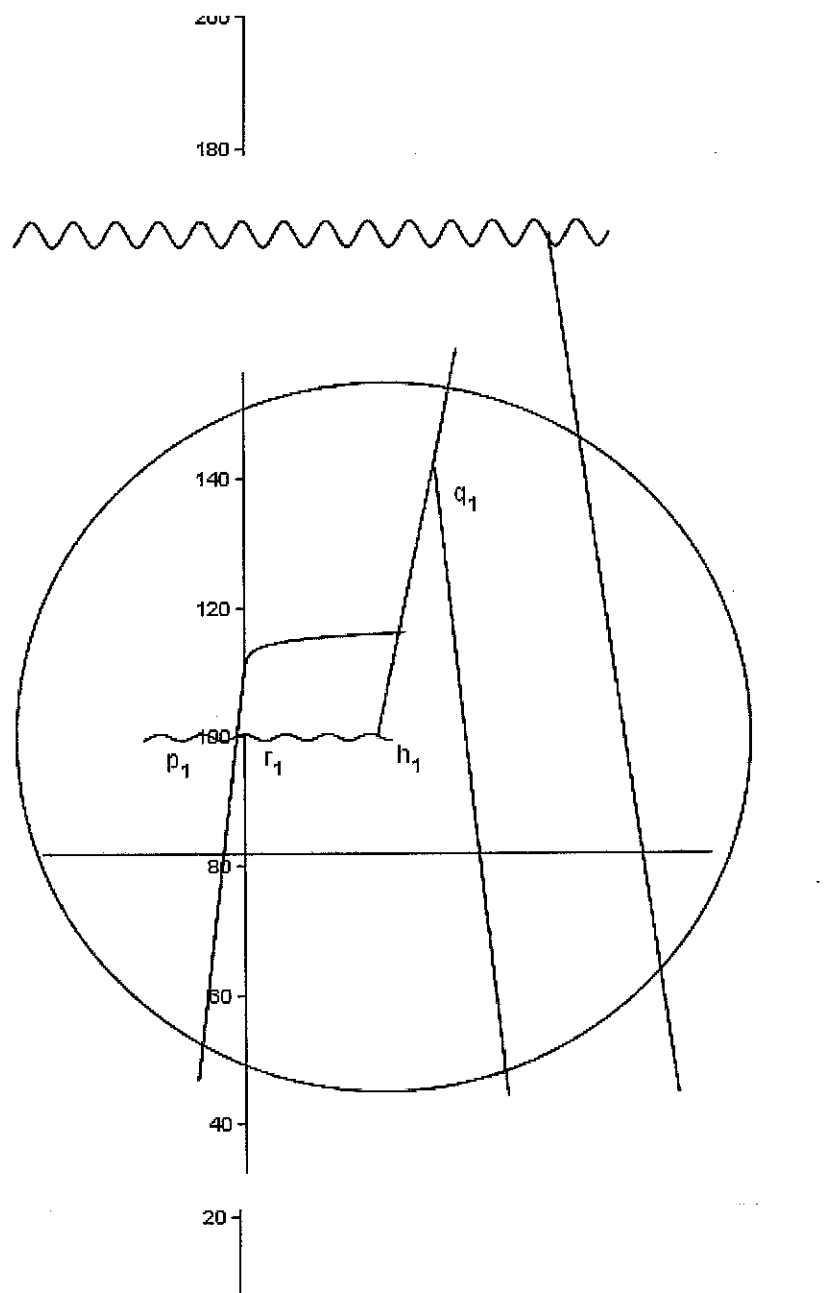
Raise and Run

Y= unit

Cos (x)



## Product Final



To be obvious, this is not the design that I wanted or used to be, and there were many different flaws. I know this chair is not perfect, however it couldn't be at all in Geogebra. I have learnt a lot from this lesson. After I finished my final product, I found it was hard to follow the size, and because of time managements I couldn't finish the product on time and do some add on to it. However I can see I design a chair with some aspect of: Comfortable. For example, the  $\cos(x)$  and the  $\log(x)$ . I'm not sure if the angles are right, however I'm sure that it was totally safe to sit on, lets talk about the rule in physic, when thing has a larger base, its hardly going to fall apart. However I still think the  $\cos(x)$  was a bit too long, I'm not sure what will happen when a people move forward to strong, however I can say he/she will roll out to the ocean because of the big circle. If you look forward detailly, some lines are not

connected.

There is a lot of things I've learnt in this unit, for example, I learnt how to determine x and y axis from the use of straight line, I think it off myself because I have done a lot of investigation and experiments before I start this process, not a good thing to talk about however it's a great experience and memory. I have also learnt to move things around, its simple like + or - something outside. Maybe my song before helped me.

However I still have a few thing concern about, I still do not understand how to do more equations, for example, cubes. And also, it a bit confusing on logs, I think its impossible to move left to right. However the main problem is that I don't know what happens to h and k. I know  $y=mx+b$  however I usually got ruined around which is slope and which is length...etc I think I usually get mixed up because the terms are too hard to understand.

This ending is all about time, we have a lot to do in this year. If I have more time I will add an umbrella, most importantly I will use cos term to make a cup stand. I can also do some thing to make it harder such as tan. There is one thing I usually wanted to do, is the back. I really want to do something soft by cos, however if I change the slope, it becomes straight line, I don't know about the reason, but I surely going to bare my to do list.

